

What is claimed is:

- 1 1. A method of improving prediction accuracy of a branch prediction scheme,
2 comprising:
 - 3 reading an individual instruction in a current set of instructions;
 - 4 fetching the individual instruction when an instruction fetch unit
 - 5 determines that the individual instruction is valid; and
 - 6 allowing the instruction fetch unit to use an index address for the fetched
 - 7 individual instruction.
- 1 2. The method of claim 1, wherein the individual instruction is a branch instruction,
2 the method further comprising:
 - 3 determining whether the branch instruction has been read in a previous set
 - 4 of instructions.
- 1 3. The method of claim 2, further comprising:
 - 2 selectively using a fetch bundle address for a plurality of fetched
 - 3 individual instructions as the index address for the branch
 - 4 instruction based on whether the branch instruction has been read
 - 5 in the previous set of instructions.
- 1 4. The method of claim 2, further comprising:
 - 2 determining a proper index address to use if the branch instruction has
 - 3 been read in the previous set of instructions.
- 1 5. The method of claim 4, further comprising:
 - 2 determining the proper index address by determining the fetch bundle
 - 3 address the branch instruction would have used if a prior branch
 - 4 instruction in the previous set of instructions had not been
 - 5 mispredicted.

1 6. The method of claim 1, wherein the branch prediction scheme is for predicting an
2 outcome of a branch instruction.

1 7. The method of claim 1, wherein the index address is used to index an entry in a
2 branch prediction structure.

1 8. The method of claim 3, wherein the fetch bundle address is an address of a first
2 instruction in the plurality of fetched individual instructions.

1 9. The method of claim 1, wherein the plurality of fetched individual instructions is
2 an instruction fetch bundle.

1 10. The method of claim 1, further comprising:
2 using decode information for the individual instruction to determine
3 whether the individual instruction is a branch instruction.

1 11. The method of claim 1, further comprising:
2 using pre-decode information for the individual instruction to determine
3 whether the individual instruction is a branch instruction.

1 12. A method of improving branch prediction accuracy, comprising:
2 receiving a set of instructions having an assigned address;
3 making a prediction for a branch instruction in the set of instructions using
4 the assigned address; and
5 retaining the assigned address for the branch instruction in the set of
6 instructions.
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- 1 13. The method of claim 12 further comprising:
 - 2 making a prediction for an other branch instruction in the set of
 - 3 instructions using the assigned address; and
 - 4 retaining the assigned address for the other branch instruction in the set of
 - 5 instructions.
- 1 14. The method of claim 12, wherein the assigned address is a fetch bundle address.
- 1 15. The method of claim 13, wherein the branch instruction is mispredicted, the
2 method further comprising:
 - 3 removing the set of instructions having the assigned address;
 - 4 receiving a second set of instructions having a second assigned address;
 - 5 recognizing a branch instruction in the second set of instruction as a
 - 6 branch instruction in the removed set of instructions; and
 - 7 making a prediction for the recognized branch instruction using the
 - 8 assigned address of the removed set of instructions.
- 1 16. A tool for improving prediction accuracy of a branch prediction scheme,
2 comprising:
 - 3 a processor for reading an individual instruction in a current set of
 - 4 instructions; and
 - 5 an instruction fetch unit for determining whether the individual instruction
 - 6 is valid and fetching the individual instruction when the individual
 - 7 instruction is valid,
 - 8 wherein an index address is used for the fetched individual instruction.
- 1 17. The tool of claim 16, wherein the individual instruction is a branch instruction,
2 and the instruction fetch unit is further for determining whether the branch
3 instruction has been read in a previous set of instructions.

1 18. The tool of claim 17, further comprising:
2 a fetch bundle address for a plurality of fetched individual instructions,
3 wherein the fetch bundle address is selectively used as the index address
4 for the branch instruction based on whether the branch instruction
5 has been read in the previous set of instructions.

1 19. The tool of claim 17, further comprising:
2 a proper index address is used if the branch instruction has been read in
3 the previous set of instructions.

1 20. The tool of claim 19, further comprising:
2 determining the proper index address by determining the fetch bundle
3 address the branch instruction would have used if a prior branch
4 instruction in the previous set of instructions had not been
5 mispredicted.

1 21. The tool of claim 16, wherein the branch prediction scheme is for predicting an
2 outcome of a branch instruction.

1 22. The tool of claim 16 further comprising:
2 an entry in a branch prediction structure indexed by the index address.

1 23. The tool of claim 18, wherein the fetch bundle address is an address of a first
2 instruction in the plurality of fetched individual instructions.

1 24. The tool of claim 16, wherein the plurality of fetched individual instructions is an
2 instruction fetch bundle.

1 25. The tool of claim 16, further comprising:
2 decode information for the individual instruction,
3 wherein the decode information is used to determine whether the
4 individual instruction is a branch instruction.

1 26. The tool of claim 16, further comprising:
2 pre-decode information for the individual instruction,
3 wherein the pre-decode information is used to determine whether the
4 individual instruction is a branch instruction.

1 27. A tool of improving branch prediction accuracy, comprising:
2 a set of instructions having an assigned address; and
3 a branch predictor for making a prediction for a branch instruction in the
4 set of instructions using the assigned address,
5 wherein the assigned address for the branch instruction in the set of
6 instructions is retained.

1 28. The tool of claim 27 wherein the assigned address is a fetch bundle address.

1 29. The tool of claim 27, wherein the branch predictor is further for making a
2 prediction for another branch instruction in the set of instructions using the
3 assigned address, wherein the assigned address for the other branch instruction in
4 the set of instructions is retained.

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1 30. The tool of claim 29, wherein the branch instruction is mispredicted, the tool
2 further comprising:
3 a second set of instructions having a second assigned address, and
4 an instruction fetch unit for
5 removing the set of instructions having the assigned address; and
6 recognizes a branch instruction in the second set of instruction as a
7 branch instruction in the removed set of instructions,

8 wherein makes a prediction for the recognized branch instruction using the
9 assigned address of the removed set of instructions.

1 31. The tool of claim 27 wherein the prediction made is a prediction of an outcome of
2 the branch instruction.

1 32. An apparatus for improving prediction accuracy of a branch instruction scheme,
2 comprising:

3 means for reading an individual instruction in a current set of instructions;

means for fetching the individual instruction when an instruction fetch unit

5 determines that the individual instruction is valid; and

means for allowing the instruction fetch unit to use an index address for the fetched individual instruction.

1 33. An apparatus for improving branch prediction accuracy, comprising:

2 means for receiving a set of instructions having an assigned address;

3 means for predicting an outcome for a branch instruction in the set of

4 instructions using the assigned address; and

means for retaining the assigned address for the branch instruction in the set of instructions.